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REVIEW OF THE CURRENT SITUATION AND OUTLOOK FOR IRON ORE - 1996

Prepared by the UNCTAD secretariat

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I. OVERVIEW AND SUMMARY

1. The iron ore market experienced another record year in 1995, with production and trade exceeding the already strong levels of the previous year. Overall, the world economy grew at a moderate rhythm, as the healthy pace of world economic expansion during the first half of the year was partly offset by the slowdown or stagnation experienced by some of the major economies during the second half. World steel production expanded at the quickest rate in seven years, with growth coming mainly from Asia, Western Europe and North America. Steel consumption in industrialized countries grew strongly in 1995, though at a slower pace than during the previous year. The main reason for this was the robust rate of increase in capital expenditure in the main industrialized countries.

2. For the first time, world iron ore production exceeded the impressive level of one billion tons. All major producers took advantage of the expanding market and raised output by operating closer to capacity, undertaking marginal capacity additions and reopening previously idled mines. Apparent consumption of iron ore also exceeded the one billion-ton mark for the first time, boosted by the vigour of the steel market and the persistent high level of scrap prices.

3. World exports reached the record level of almost 452 million tons (Mt). The largest exporters remained Australia and Brazil, while the importance of developing Asia as an importing market continued increasing. The strength of the iron ore market helped push freight rates to record levels during the first half of 1995. Iron ore remained the most traded non energy commodity in terms of volume and value, with total world exports reaching US$ 8.3 billion.

4. In both 1995 and 1996, iron ore prices finally rose (accumulating an increase of 12.2 per cent), in a belated answer to the strength experienced by the iron ore market since late 1992. However, these prices increases were generally not enough to compensate for the decline accumulated since that year, even in nominal terms. From 1992 to 1994, prices had fallen continuously, despite the healthy development of the iron ore market over most of that period. In 1995 and the first half of the following year, the pellet market continued to be tight and this was (at least partly) reflected in the increase of the premium of pellets over fines. The same is true, though to a lesser extent, of the lumps market.

II. FACTORS INFLUENCING IRON ORE DEMAND

5. Demand for iron ore followed an irregular pattern in 1995. It was extremely strong during the first half, when the outlook for steel demand seemed very bullish. In some major markets, imports of iron ore rose heftily during the January-June period: China (where they increased by 53 per cent), Japan (7.5 per cent) and European Union (7 per cent). However, during the second half economic growth in most large economies cooled down and steel producers scaled back their output. This entailed a considerable fall in the pace of import growth. However, the yearly result was still quite positive, as apparent consumption of iron ore rose by 5.8 per cent (see table 1).

Table 1
World apparent consumption of iron ore, 1988 - 1995
(million tons)

Regions or countries	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
Developed countries	**367.3**	**379.0**	**345.9**	**329.4**	**353.5**	**373.5**	**36.9**	**5.7**
of which: EU (15)	153.0	150.2	139.3	128.6	146.2	150.0	14.8	2.6
Japan	123.7	125.5	113.7	114.5	116.1	120.4	11.9	3.7
United States	72.4	71.3	63.4	64.6	70.9	75.5	7.5	6.6
Developing countries	**158.6**	**172.7**	**185.6**	**181.8**	**193.0**	**209.1**	**20.7**	**8.3**
of which: Asia	70.6	85.8	98.7	103.4	106.3	119.0	11.8	11.9
America	60.5	59.4	62.3	60.0	67.6	71.9	7.1	6.3
Africa	20.6	21.9	22.4	17.5	19.1	18.2	1.8	-4.8
Eastern Europe	**265.1**	**248.6**	**170.4**	**150.8**	**132.5**	**136.9**	**13.5**	**3.3**
of which: CIS	204.9	199.7	145.0	123.0	102.4	101.4	10.0	-1.0
China	**165.3**	**183.7**	**221.1**	**267.8**	**276.3**	**291.5**	**28.8**	**5.5**
WORLD TOTAL	**956.3**	**983.9**	**923.0**	**929.7**	**955.3**	**1010.9**	**100.0**	**5.8**

Source: UNCTAD secretariat

A. Developments in the steel market

6. World crude steel production in 1995 expanded by 2.8 per cent, the quickest pace since 1988 (see table 2). It reached 749 Mt and was the highest ever outside the former USSR. Production increased in all regions and among the world's 20 largest producing countries, only Brazil and Ukraine showed lower year-on-year output figures. The largest contributors to the increase in world production were the major iron ore importing markets, namely Western Europe, Japan and developing Asia. Non-residential private investment in the OECD area grew by 8.2 per cent, which pushed steel demand in these countries. It was underpinned by non-residential construction and by the industrial and electrical machinery industries, which more than compensated the widespread weakness of demand from the automobile industry. Although steel demand in industrialized countries grew at a slower rhythm than in 1994, this still gave a boost to world steel production and trade. Consequently, it also contributed to raise iron ore demand and trade to record levels (see chart 1).

7. The evolution of the world steel market was uneven along the year. The first quarter saw production increasing at a robust pace and prices sustained at the high levels reached in late 1994. Thereafter, however, the situation deteriorated continuously. Steel inventories held by consumers and merchants accumulated, which led producers to gradually hold back their output as they strove to adjust to market conditions. A stock reduction programme was undertaken in the United States in the second and third quarters of 1995, while in Western Europe and Japan it extended over the end of that year and into the first half of 1996. These developments, combined with the steel export drive of Eastern Europe, United States and China, caused steel prices to collapse from the second quarter of 1995 and well into1996.

Table 2
Steel production by major producing countries, 1988 - 1995
(million tons)

Country	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
1 Japan	105.7	110.3	98.1	99.6	98.3	101.7	13.6	3.4
2 United States	90.6	88.9	84.3	88.8	91.2	93.6	12.5	2.5
3 China	59.4	66.3	80.9	89.5	92.6	93.0	12.4	0.4
4 Former USSR	163.0	154.3	118.0	97.8	78.3	78.8	10.5	0.7
5 Germany[a]	41.0	38.4	39.7	37.6	40.8	42.1	5.6	3.0
6 Rep. of Korea	19.1	23.1	28.1	33.0	33.7	36.8	4.9	9.0
7 Italy	23.8	25.5	24.8	25.7	26.2	27.8	3.7	6.2
8 Brazil	24.7	20.6	23.9	25.2	25.7	25.1	3.3	-2.6
9 India	14.3	15.0	18.1	18.2	19.3	20.2	2.7	4.8
10 France	18.6	19.0	18.0	17.1	18.0	18.1	2.4	0.4
WORLD TOTAL	**778.5**	**768.7**	**720.9**	**728.9**	**728.0**	**748.5**	**100.0**	**2.8**

Source: UNCTAD secretariat and International Iron and Steel Institute
a - From 1991 onwards, unified territory

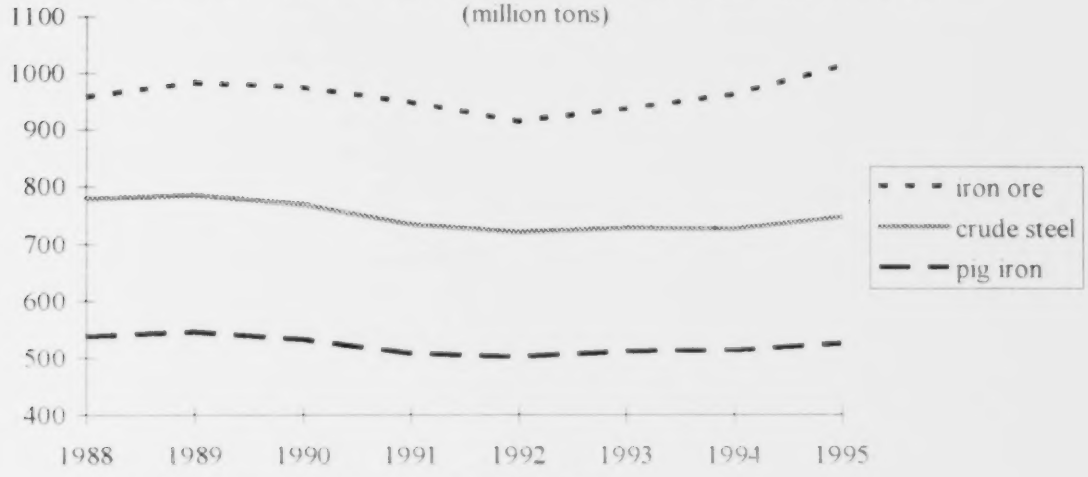
8. In the European Union, steel production grew by 3 per cent in 1995. The major output gains took place in Italy and Germany and, to a lesser extent, Austria, Spain and United Kingdom. Steel demand grew mainly during the first half, thanks to stockbuilding and to the strength of real consumption. The strong demand and the appreciation of the main European currencies caused the sharp rise of the EU steel imports, which progressed by one third. They originated mainly from North America, Eastern Europe and the CIS. However, during the last quarter of the year and most of 1996 economic growth in most European countries slowed down considerably or came to a halt, which led the region's steel market to cool down. Producers scaled back output and European iron ore imports were also dampened.

9. In Japan, the growth of steel demand due to the reconstruction following the Great Anshin/Awaji Earthquake of January 1995 led to a significant boost in steel production and imports during the first half of 1995. However, this was greatly attenuated during the second half, under the impact of the weaker than expected domestic demand (as reconstruction took considerably longer than initially expected and the effects of the governments fiscal stimulus package were felt only in the first half of 1996) and the persistent strength of the yen. The latter greatly contributed to the stagnation of the country's steel exports and to the 21 per cent increase in its imports. Still, Japanese steel production grew by 3.4 per cent. Domestic steel demand rose slightly, thanks to construction (mainly public works) and manufacturing (basically shipbuilding and the electrical and industrial machinery industries). As a result, iron ore imports into Japan increased 3.7 per cent on the level of 1994.

10. The United States steel market was quite robust in 1995, thanks to economic growth abroad, which led to the strength of steel-consuming sectors, thereby favouring the increase in exports of the country's steel products. This explains the surge of the iron ore mining activities in the United States. Domestic demand for steel was sustained by the rise of investment, which pushed up the steel consumption of the construction, energy and durable manufacturing sectors. However, steel demand by the automobile industry, a more important market, fell.

Chart 1

World production of iron ore, crude steel and pig iron, 1988 - 1995



Source: UNCTAD secretariat and International Iron and Steel Institute.

11. In Eastern Europe the economic recovery process strengthened, thereby causing demand for steel and hence for iron ore to increase in most countries. This brought about a rise in the region's steel production (by 5.1 per cent, excluding the republics of the former USSR) and imports (which grew by as much as 18 per cent). For the first time since the demise of the USSR, the steel output of the Russian Federation stopped falling and rose at a pace similar to Eastern Europe. Nevertheless, it should be noted that the 79 Mt produced by the CIS countries in 1995 amounted to less than 50 per cent of the total crude steel production of the USSR in 1988. Demand for Russian steel was underpinned by the turnaround in the country's industrial production (including the chemical and paper industries) and by the 16 per cent growth of exports, directed to Asia and Western and Eastern Europe. The bottoming out of the Russian steel industry more than compensated the continuing fall of Ukrainian steel production and thus brought the six-year long decline of combined steel output of the former Soviet republics to a halt.

12. Among developing countries, steel production expanded vigorously in the Republic of Korea, Mexico and India, out of which only the first is a large importer of iron ore. In the Republic of Korea and India, steel output rose so as to meet rapidly growing domestic demand for steel, while in the case of Mexico domestic consumption fell, but was more than compensated be the expansion of

exports (basically to the United States market). Elsewhere in the developing world, steel production remained stagnant in China (which was placed third in terms of both crude steel production and iron ore imports) and experienced a contraction in Brazil. The Chinese government has shifted the focus of its policy for steel from increasing production to consolidating the industry and upgrading the quality and product mix. In Brazil, the slight reduction in steel output was brought about by technical problems in several steel mills.

13. Until 1994 the dynamism of Chinese steel demand played an important role in sustaining the international steel market before consumption recovered in Western Europe and Japan. In 1995, however, the pattern of steel trade changed considerably. Japanese and European net steel exports decreased under the pressure of their appreciated currencies on one side and of the steel export drive of United States, China, Russian Federation and Eastern Europe on the other. Net imports into China plummeted from 22 Mt to just 4 Mt, as a result of the combination of the quadrupling of its exports with the almost halving of its imports. Thereby, local producers and traders strove to reduce excess inventories accumulated during the import binge of 1993 and 1994. On the other hand, the steel exports of the United States reached in 1995 the highest level since 1940. This was favoured by the depreciation of the dollar, domestic customer inventory reduction programmes and the increased competitiveness of the United States steel industry. Consequently, the country's net steel imports plunged from 24 Mt in 1994 to 16 Mt in 1995. Another important development in international steel trade was the growth of Russian, Ukrainian and Eastern European steel exports.

14. These developments in international steel trade partly explain the difference in the pattern of growth in iron ore trade and production in 1994 and 1995. During the previous year, exports grew far more strongly (by 7.3 per cent) than world output (2.7 per cent). In 1995, by contrast, world production of iron ore expanded at approximately the same pace as exports. This is a consequence, on one side, of the moderate growth of exports of iron ore to the major markets (European Union and Japan). On the other hand, the expansion of world iron ore output was due to higher production not only by exporters of ore, but also by those countries which are large producers of both iron ore and steel and which were successful in expanding their steel exports considerably (China, Russian Federation, United States).

15. The long-term trends towards declining worldwide employment by the steel industry contrasting with its growing output continued in 1995. This was the case in some major producing regions and countries like the European Union, Japan, Brazil and South Africa. Employment experienced a marginal increase in the United States and a more significant one in Canada, though this was by far not enough to compensate the decline in the above-mentioned countries. Consequently, total employment in some major steel-producing countries (excluding China) declined by 2.4 per cent[1].

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[1] International Iron and Steel Institute, *World Steel in Figures*, 1996 edition. Employment by the Chinese steel industry, on the other hand, is reported to have increased from 3.1 million to 4.6 million betweeen 1994 and 1995.

B. Ferrous metallics market

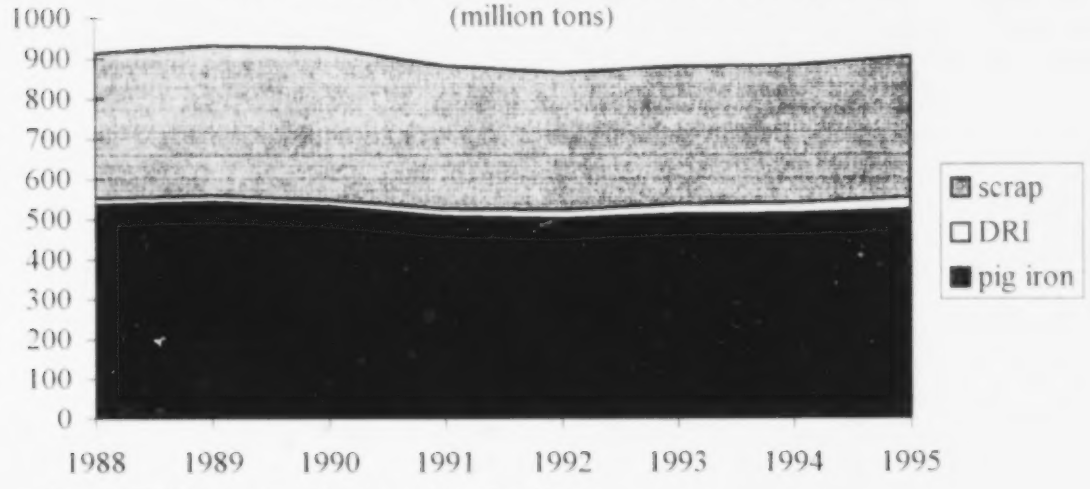
16. Competition among different types of metallic raw materials for steelmaking remained fierce in 1995. Ferrous scrap prices persisted at high levels. This increased the competitiveness of pig iron and, consequently of iron ore, and strengthened the steel industry's resolve to invest in new scrap substitutes facilities and in research on new technologies for the production of these substitutes.

1. Pig iron

17. Worldwide the use of blast furnaces (BOF/OH) for steelmaking is gradually declining. In 1995, only 67 per cent of world crude steel production came from this route, as compared to 73 per cent in 1988. The decline just was not steeper due to the rapid expansion of China's steel production since 1990, which has been mostly blast furnace-based (in 1995 it was stagnant). Nevertheless, pig iron remained the most used metallic for steelmaking, accounting for an estimated 58 per cent of the world's total ferrous metallics input to steel production (see chart 2). World output of this raw material expanded 2.3 per cent in 1995 and reached the level of 525 Mt, thanks mainly to the expansion of pig iron capacity in the largest producing country, China. This country and the Russian Federation accounted for two thirds of the net increase in world output.

Chart 2

World demand for ferrous metallics, 1988 - 1995



Source: UNCTAD secretariat and International Iron and Steel Institute.

18. The doubling of China's pig iron production over the last ten years brought about a significant change in its position in world trade of this metallic. Having been a net importer for most of that period, the country became a substantial net exporter in 1994 and 1995. During the last year, the country's steel producers concentrated on production and exports of pig iron as they were ordered to reduce steel output. Net imports of pig iron into Japan, on the other hand, soared fivefold in 1995.

2. Direct reduced iron (DRI)

19. World DRI production pursued its rapid expansionary trend in 1995, when it reached 31 Mt. This represents a 50 per cent growth since 1992, although it still supplies only 3.4 per cent of world demand for ferrous metallics. The major advances came from Asia (mainly India and Islamic Republic of Iran, where new DRI plants were commissioned) and, to a much lesser extent, North America (Mexico and Canada). India displaced Venezuela as the foremost DRI producing country, while Mexico came third. Shipments of DRI and hot briquetted iron (HBI) - an indication of the size of the merchant market - rose by 20 per cent to 8 Mt, amounting to 26 per cent of world total output[2]. At the same time, world total DRI production increased by 8.3 per cent. The rapid expansion of DRI production contributed to the continuing tightness of the market for pellets and lump ores.

20. Growth in demand for DRI is being spurred by persistently high scrap prices, which are expected to remain at high levels over the medium term thanks to the continuous expansion of EAF capacity. This outlook has been increasingly leading steelmakers to look for scrap substitutes. Additionally, higher demand for DRI is also caused by environmental concerns (since it is produced using "cleaner" technologies) and by the relatively recent move of the electric furnaces into higher grades of steel. This spurs their requirements for DRI with fewer impurities. In the medium term, world DRI production is forecast to expand to 48 Mt in 2000 and 53 Mt in 2005[3].

21. The expected further rise in demand for DRI explains the large number of new plants that are now at the execution or planning stage (see annex III). These plans foresee the construction of plants in countries which do not at present produce DRI (mainly Australia, but also Republic of Korea and Thailand), as well as the expansion of already existing national capacity. This is the case of Venezuela, Mexico, Bahrain and Islamic Republic of Iran, as well as United States, where DRI plants have not been built for 25 years. Given that DRI production is a higher value-added activity than iron ore mining and pelletizing, several governments are offering tax breaks in order to foster the installation of DRI plants in their territory and thereby give an incentive the downstream processing of iron ore. This is the case, for example, of Western Australia, Minnesota (United States) and Venezuela.

3. Ferrous scrap

22. The strong expansion of steel production in electric arc furnaces (EAFs, which now account for one third of world steel output) has caused a persistent increase in demand for scrap. This has been particularly true in the United States, where EAF-based steel production rose from 26 Mt in 1985 to 37 Mt in 1995. More recently, the country's ferrous scrap consumption by the steel industry grew from 62 Mt in 1991 to an estimated 72 Mt in 1995, as approximately 40 per cent of the

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[2] Midrex, *World Direct Reduction Statistics 1995*.

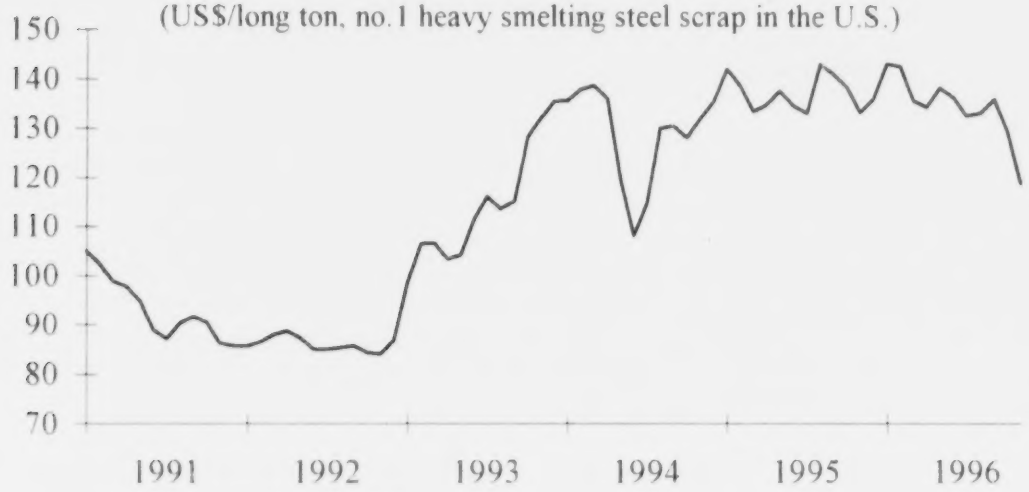
[3] Midrex, *World Direct Reduction Statistics 1995*.

country's steel production now originate in electric furnaces. United States scrap prices, which traditionally had been highly cyclical, have escalated and remained at relatively high levels since mid-1992 (see chart 3). As the country is the largest exporter of ferrous scrap, the increase of domestic scrap demand and prices has had an impact on the world market. The soaring prices and tightness of the international scrap market have favoured demand for alternative virgin-iron-based metallics. This strongly contributed to the strong growth of demand for iron ore between late 1992 and 1995.

Chart 3

Ferrous scrap prices, 1991 - 1996

(US$/long ton, no.1 heavy smelting steel scrap in the U.S.)



Source: American Metal Market

23. In the years to the end of the century, ferrous scrap demand in the United States is likely to rise thanks to new steel capacity (stemming from both new minimills and marginal expansion in integrated steelmakers) coming on stream[4]. Domestic consumers will compete with foreign ones and exports will come under pressure. This is likely to sustain prices both in the United States and abroad. Therefore, the fall in the country's scrap prices, which started in late 1996, could be temporary, rather than a fundamental change in the medium-term trend. In any case, the pressure on scrap will abate when new merchant DRI output becomes available in the United States. The unforeseeable variable in this picture is the supply side, i.e., the quantity and quality of scrap collection that will arise in response to these market trends.

24. Scrap supply to the West European market is likely to increase in the coming years with the implementation of agreements negotiated by the European Union and Eastern European countries. They foresee the elimination or reduction of the latter's restrictions on scrap exports. However, these agreements are likely to have an impact mainly on Eastern European steel exports and probably will

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[4] US mini-mills have expansion plans that foresee a total 8.6 Mtpy additional capacity coming on stream between 1996 and 1998 (Raw materials for steel capacity buildups in Asia, North America (2). *The Tex Report*, July 10, 1996).

not affect the world scrap market significantly.

25. In both the United States and Western Europe the scrap collecting and supplying industry is undergoing a change towards a higher degree of concentration and rationalization, brought about by a series of mergers and acquisitions among companies[5]. This has been caused mainly by two reasons: (i) larger units are more capable of meeting higher quality requirements of the steel industry and stricter environmental legislation, as well as reducing costs; and (ii) the scrap industry is following the steel industry's trend of higher concentration and internationalization. Such concentration, however, is unlikely to lead to price control by the largest companies and the scrap market should remain a competitive one in the foreseeable future.

C. Iron ore stocks

26. As the iron ore market reached an unprecedented boom, producers had to draw down their stocks in order to face the growth of demand, particularly until the third quarter of the year. Australian producers' stocks fell by 2.4 Mt between the end of 1994 and 1995. The porthead stocks of Hamersley, for instance, were reported to have been reduced from their usual level of 9 Mt to 5 Mt during the year[6]. From the last quarter of 1995 onwards, however, producers' stocks started to build up, as demand in some key markets (mainly Western Europe and, to a lesser extent, Japan) weathered down. Iron ore miners rebuilt their desired levels in early 1996 and thereafter most of them adjusted their production levels so as to avoid a further increase in the gap between production and shipments.

27. On the consumer side, many steel producers strove to increase their stock levels during 1995 in anticipation of higher prices in 1996. Iron ore stocks grew by 1.1 Mt in Japan, whose imports expanded by 4 Mt, while pig iron output rose by only 1 Mt. Similarly, in the Republic of Korea consumer stocks are reported to have risen by 30 per cent during the year. In Western Europe, reported consumer stocks increased in Belgium and, to a lesser extent, Netherlands, Italy and United Kingdom. In Germany, until 1995 the second largest iron ore importing country, stocks built up during the fourth quarter of that year, due to the falling pig iron production. During 1996, German steelmakers reduced these stocks by consuming a significant part of them[7]. This allowed them to cut down current imports of iron ore (which had higher unit prices than those of the stocked materials).

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[5] Merger mania in European scrap. *Metal Bulletin Monthly*, May 1996; Mergers may change face of US scrap sector. *Metal Bulletin*, 22 April 1996.

[6] World iron ore market for 1996 - (2). *The Tex Report*, June 5, 1996.

[7] Stocks overhang hits German intake. *Metal Bulletin*, 19 september 1996.

III. FACTORS INFLUENCING IRON ORE SUPPLY

28. Taking advantage of the strong growth of domestic and international iron ore demand, most producers raised output by operating closer to capacity, expanding capacity marginally and/or reopening previously idled mines. World production of iron ore in 1995 grew by 5.8 per cent, the quickest pace in more than a decade. It reached a record level and for the first time exceeded the mark of one billion tons (see table 3). The exceptional performance follows two other years of strong growth. Having fallen over the 1990-1992 period under the impact of the worldwide recession, world iron ore output accumulated an expansion of 11 per cent in the following three years, more than compensating the previous slump.

Table 3
Iron ore production by major producing countries, 1988 - 1995
(million tons, natural weight)

Country	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
1 China[a]	154.8	169.4	195.9	234.7	239.0	250.4	24.6	4.8
2 Brazil	146.0	152.3	145.9	150.0	167.8	177.3	17.4	5.7
3 Australia	96.1	112.0	117.2	121.4	128.7	144.6	14.2	12.4
4 Former USSR	248.0	236.0	175.0	154.0	133.5	135.0	13.2	1.1
5 India	50.0	53.7	54.9	55.6	58.4	66.8	6.5	14.3
6 United States	57.5	56.4	56.0	55.7	58.4	63.3	6.2	8.4
7 Canada	40.4	36.0	34.4	32.3	37.0	37.9	3.7	2.4
8 South Africa	25.2	30.3	28.2	29.4	30.5	31.9	3.1	4.8
9 Sweden	20.4	19.9	19.3	18.7	19.9	21.7	2.1	8.8
10 Venezuela	18.5	20.1	18.1	17.5	18.0	18.9	1.9	5.4
WORLD TOTAL	**958.0**	**974.9**	**915.7**	**938.3**	**964.1**	**1019.9**	**100.0**	**5.8**

Source: UNCTAD secretariat
a - Mostly low-grade crude ore, not usable as such

29. The largest gains in production in 1995 took place in countries that consume most or all of their domestic output (China, Russian Federation, United States) and in those whose exports largely exceed domestic consumption (Australia, Brazil), as well as in India (whose exports absorb approximately half of the domestic output).

A. World markets for agglomerated ores

1. Sinter

30. In 1995, world production of sinter rose for the second consecutive year, thus reversing the continuous fall of the 1990-1993 period. This was brought about basically by the ongoing expansion

of the output of China (the largest producer) and Republic of Korea and by the turnaround experienced by the Russian steel industry. As for developed countries, sinter output grew mostly in Japan, Germany and, to a lesser extent, United States, while in 1994 it had advanced significantly in France and Germany. The expansion of sinter output was spurred by its strengthened competitiveness *vis-à-vis* direct charge ores and scrap. It happened in spite of the fact that in the European Union and in Japan sintering capacity has been gradually reduced along the last years because of environmental pressure. In both 1994 and 1995 sinter became more competitive thanks to the lower price of fines as compared to costlier pellets and lumps (given the increase of the price premium of the latter). While the world market for high-grade pellets and lumps has been tight between 1993 and 1995 (see paragraphs 63-66), the market for fines is considered to be in balance. Fines and concentrates remain the most used type of marketable ore, accounting for 60 per cent of total iron ore consumption.

2. Pellets

31. The rapid growth of DRI production (see paragraphs 21-23) has pushed up demand for pellets, which has risen faster than supply capacity. Therefore, the market for these products has been tight since 1993, which is at least partially reflected by the price premium of pellets over fines. This situation prevailed despite the expansion of both pellet production and exports. In 1995 the world output was the highest since 1990. In the United States, the world's largest producer of pellets, output in 1995 was the largest since 1981 and producers operated at full capacity[8]. World exports expanded by 7.7 per cent and Brazil remained the main exporting country (see table 4). Exporters were reported to be over-booked during the year. In 1996, by contrast, the pellet market was less tight, given the softening of demand in the largest importing market, Western Europe (and in particular Germany).

32. The outlook for the pellet market in the coming year is of continuing expansion of demand[9]. Therefore, producers are expanding capacity. New palletizing plants became operational in the United States and in Sweden in 1995 and several other facilities are scheduled for start-up until the end of the century (see annex II). The bulk of the committed new pelletizing capacity until the end of the century is bound to be located in Brazil, whose production is geared basically towards the export market. In order to supply the existing and the future demand from its pellet plants, Brazil's CVRD has upgraded its four major mines in the Minas Gerais state to boost the output of pellet feed (partly switching away from fines) and in particular of direct reduction-grade material. Additionally, the capacity of these mines will be expanded significantly until the end of the century. Brazil's Samarco, at present the largest supplier of pellet feed to the market, will stop selling this product as all of its output will start being absorbed by the company's new pellet plant by the end of the century. Elsewhere in Latin America, new pellet plants are being planned in Venezuela and Peru (the latter's sinter feed production is scheduled to be phased out). In Australia, Robe River is considering

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[8] Pellets/Reduced iron - It's time to bite the bullet. *Skillings Mining Review*, June 1, 1996.

[9] If the forecast growth of world DRI output to 53 Mt by 2005 materializes, this should entail an additional demand for pellets of 30 Mt (*Financial Times*, March 14, 1996).

reopening its closed down Cape Lambert plant. Other plants are at the planning stage, as part of complexes including DRI plants. The coming on stream of the new pellet plants being planned at present, however, might bring only a limited respite to the pellets market, since part of their output will have captive markets. Consumers are taking part in many of these projects so as to secure their supply of pellets and therefore part or all of their production will not be available on the pellet market. This is the case of most plants in Brazil, Australia (except for Robe River's), Peru and Venezuela.

Table 4
Major pellets exporters, 1988 - 1995
(million tons)

Country	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
1 Brazil	23.8	20.0	21.3	23.0	26.8	27.1	31.2	1.3
2 Canada	17.6	12.8	13.3	12.9	16.0	17.3	19.9	7.9
3 Former USSR	10.9	12.3	9.8	11.2	12.0	13.0	15.0	8.3
4 Sweden	6.5	6.5	6.7	7.5	6.9	9.3	10.7	34.6
5 United States	5.2	3.0	4.7	5.0	4.9	5.2	5.9	5.7
6 Peru	1.5	1.2	1.1	2.3	3.9	3.5	4.0	-10.4
7 Bahrain	0.0	0.9	0.9	2.1	2.9	3.0	3.5	3.4
8 Chile	3.5	3.4	2.8	3.6	3.3	3.0	3.4	-8.5
9 Venezuela	0.8	1.2	1.1	1.2	1.1	2.6	3.0	141.0
10 India	1.6	1.7	1.5	2.2	1.9	2.1	2.4	13.3
WORLD TOTAL	**77.8**	**67.4**	**64.5**	**72.7**	**80.8**	**87.0**	**100.0**	**7.7**

Source: UNCTAD secretariat

B. Regional developments

1. Africa

33. In **South Africa**, iron ore production rose for the third consecutive year, reaching 32 Mt. This was achieved thanks mainly to Iscor's record output. It originated basically from the Sishen mine, whose production grew thanks to the optimization of activities, debottlenecking and by the first full year of operation of a plant designed to produce 4 Mtpy of direct reduction grade iron ore. Virtually all of the increased South Africa production was absorbed by the growth of exports.

34. Elsewhere in Africa, **Mauritanian** production and exports rose by 10 per cent, the fourth consecutive year of expansion, thanks to SNIM's to the first full year of production of the company's M'Haoudat mine and to its other mines operating closer to capacity.

2. Asia

35. **Chinese** iron ore production increased to 250 Mt in 1995, thereby continuing the expansionary trend it has followed for ten years. This volume was approximately 50 per cent larger than the one recorded only five years earlier. The rise in output, together with additional imports, allowed a strong increase in pig iron production. Thereby, China further consolidated its position as the world's largest pig iron producer, which it has occupied since it displaced Japan in 1992. This additional output of pig iron, however, was destined not so much to domestic consumption (since steel production remained stagnant), but to exports, which rose threefold. Chinese steel consumption suffered under the impact of austerity measures and the emphasis was put on the expansion of pig iron and steel imports, an effort in which the country was successful in 1995. In the coming years it is unlikely that China's iron ore production will continue increasing at such a robust rhythm. It may even stagnate around the level reached so far, given the country's low-grade reserves and the high financial cost to commission new mines. This highlights the need for considerably larger imports (see paragraph 61).

36. **India**'s iron ore output grew at the quickest rate in nine years and reached 67 Mt. This was achieved through the optimization of operations of existing mines. The country's authorities are striving to raise mine output in order to meet booming domestic demand and export commitments at the same time. In 1995 iron ore output grew by 14 per cent and the additional production was directed mainly to the domestic market (where crude steel production advanced by 5 per cent), while iron ore exports stayed flat. In the future, raising Indian iron ore production will require further optimization of existing mines and substantial investment for the commissioning of new large mechanized opencast mines[10].

3. Eastern Europe

37. The sharply falling path that **Russian** iron ore output had followed since the demise of the USSR was finally reversed in 1995, when it rose by 7 per cent. This was in line with the slow turnaround experienced by the Russian economy and, more specifically, by the country's steel industry. However, as profitability criteria are increasingly taken into account by producers, Russian iron ore output over the medium term will be threatened by the following factors: (i) the suspension, since 1990, of investment to explore for new orebodies in order to replace depleting ones; (ii) the low grade of the country's reserves; and (iii) the relatively high production costs. In order to keep producing the amount demanded by the domestic steel industry and, moreover, regain its export levels, a strong investment programme (possibly involving foreign capital) is necessary[11].

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[10] C.S. Mohan, *Perspectives for Iron Ore - 2010* and K. Chadha, *Exports of Iron Ore*, papers presented during the fourth session of the Intergovernmental Group of Experts in Iron Ore (Geneva, 23-25 October 1995).

[11] L. Antonenko, *About state and prospect for development of raw materials source of iron and steel industry*, paper presented during the fourth session of the Intergovernmental Group of Experts on Iron Ore (Geneva, 23-25 October 1995).

38. Contrasting with the situation of the Russian Federation, the **Ukrainian** iron and steel industries have not stabilized yet and their output continued sliding in 1995. In order to reverse this, the country's government is preparing a scheme of tax incentives and other privileges to encourage foreign investment in the Ukrainian iron ore mines and steel mills[12].

4. Western Europe

39. Iron ore production in **Sweden** progressed by 9 per cent to 22 Mt, four fifths of which were exported. Thanks to the first full year of operation of LKAB's new pelletizing plant, the share of pellets in total output grew significantly. Having produced 2.8 Mt in 1995, the plant is scheduled to reach its design capacity of 4 Mtpy in 1996.

40. Elsewhere in Western Europe, production of iron ore has pursued its declining trend caused by mine closures and depletion of reserves. It fell in Norway, Spain and France. Austrian output grew slightly, but it is also bound to cease as Voest-Alpine's Erzberg mine is eventually closed down. Given the mine closures planned in France, Norway and Austria (see annex I), in the coming years, Western European countries (with the only exception of Sweden) will become virtually completely dependent on imports for their supply of iron ore.

5. Latin America and the Caribbean

41. **Brazil** kept its position as the largest producer of marketable ore (since less than half of the Chinese production is usable as such), as its output expanded by 6 per cent to 177 Mt. Virtually all the additional production was attributable to CVRD, whose net marketable output expanded by 9 Mt. This more than compensated slight falls in both MBR's and Ferteco's production. The country's iron ore companies increased output by using capacity at a higher rate and by undertaking marginal capacity expansions in their existing operations (e.g., the new concentration plant in CVRD's Timbopeba mine). The country's exports rose by 5 per cent while its apparent consumption expanded by 7.4 per cent. However, some Brazilian steel mills were affected by technical problems, so that pig iron output declined, as did steel production and exports.

42. **Venezuela**'s iron ore production expanded to 19 Mt, but its exports remained flat at 10.6 Mt. The country's iron ore authorities are shifting emphasis away from iron ore exports (a field in which Venezuela is less competitive) towards production and exports of DRI. Thereby, exports would incorporate higher value-added and would take advantage of the country's low gas cost. This explains the large capacity that is being planned for start-up into the next century (see annex III). In **Chile** Compañia Minera de Huasco commissioned the Los Colorados mine in January 1995. It will produce pellet feed in order to replace output from Algarrobo, which is being depleted. During the year, however, this was not enough to prevent domestic output and exports from falling by 8 per cent.

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[12] CIS hopes for brighter future after tough 1995. *Metal Bulletin*, 29 December 1995. The Slovakian steel producer VSZ, for instance, has announced plans to invest in Ukraine's Krivoy Rog in order to secure its pellets supply (Eastern Europe sees uneven development. *Metal Bulletin*, 29 December 1995).

Therefore, work on expansion of the new mine started already in December of the same year.

6. North America

43. In the **United States**, the dynamism of the steel industry caused the country's iron ore mines to operate at full capacity and led companies to reopen previously idled plants. Such was the case of the pellet plants of National Steel and Northshore, as well as the Eveleth and Silver Bay mines. Having fluctuated around the level of 56 Mt since 1988, the United States iron ore production reached 63 Mt in 1995, thanks partly to the hefty investment programme undertaken by the largest producer, Cleveland-Cliffs.

7. Oceania

44. **Australia**'s iron ore output expanded by 12 per cent to 145 Mt, the quickest expansion rate among major producers and it also accounted for the largest increase in marketable ore output. The production growth of 16 Mt was the result basically of: (i) the completion of the 5 Mtpy capacity expansion at BHP's Yandi mine; (ii) Robe River's investment in infrastructure, which caused production capacity to increase; and (iii) the first full year of operation of Hamersley's Marandoo mine. The higher output allowed exports to expand by as much as 10 per cent.

45. The expansion of mining capacity in Australia, mostly concentrated on West Australia's Pilbara region, continues. In late 1995, BHP commissioned the expansion of the Jimblebar operations (+5 Mtpy), while the start-up of its Yandi 2 (initially with a 10-Mtpy capacity) is scheduled for the second half of 1996. Robe River commissioned a 2-Mtpy marginal capacity expansion at its operations in February 1996. Meanwhile, Hamersley is to increase the capacity of its Marandoo mine from 8 Mtpy to 12 Mtpy in 1996. The established largest three companies have other plans for mining capacity expansion, as do smaller companies, including new entrants to the iron ore industry (see annex I).

46. West Australia continues its policies to bolster further processing of iron ore within the state, by deregulating the energy market (which has caused gas prices to fall by approximately half), negotiating processing commitments with mining companies and granting royalty concessions to higher degrees of processing. These measures are beginning to bear results. Several companies are planning to commission or reopen pellet plants and DRI/HBI facilities, whether or not they are integrated to iron ore mines (see annexes II and III). The construction of the country's first DRI plant (by BHP in Port Headland) started in late 1995.

C. Investments and projects financing

47. Pelletizing plants are attracting a significative part of the iron ore industry's investment budgets. The reason for that is the premium pellets are commanding over fines prices and the positive outlook for the pellet markets (see paragraph 32). Investors see this premium as a cushion to protect them to some extent from the next cyclical downturn in iron ore prices. The tightness of the lumps market has also led companies to invest in lump production capacity expansion. This was the case

of Robe River's 2 Mtpy additional lump ore capacity expansion finished in early 1996 and BHP's plan to expand Mount Newman lump ore output from 19 Mtpy to 22 Mtpy between 1996 and 2001.

48. In 1995 iron ore companies did not focus their attention so much on raising funds on the capital markets (see paragraph 49). Most of the expansion projects currently under way are being financed by their cash reserves and by forming joint-ventures with costumers. Mine expansions of established iron ore producers are being largely financed by their cash reserves, while joint-ventures are being established particularly in the case of higher value-added operations like pelletizing and DRI plants. Such partnerships give mining companies part of the funds required to finance their projects, while at the same time guaranteeing a captive market for at least part of the output of the new plants. On the other hand, the access to capital markets is stronger in the case of large mine-to-steel projects, particularly when they are being led by companies/joint-ventures which are newcomers to the iron and steel industry.

D. Privatization and corporate highlights

49. In 1995 the financial activities of the world mining industry concentrated its attention on mergers, acquisitions and shares buybacks, rather than on raising funds on capital markets[13]. In the case of the iron ore industry, by far the most important transaction was the merger of the British company RTZ and its 49 per cent-owned Australian associate, CRA, into a dual-listed company. The merger received shareholders' approval in December 1995, thereby creating a company (RTZ-CRA) with a market capitalization in excess of US$ 20 billion. It controls Australia's second largest iron ore producer and exporter, Hamersley Iron. However, the merger should have no major direct impact on the latter company's operations.

50. The preparation of the privatization of the world's largest iron ore producing and exporting company, Brazil's CVRD, proceeded slowly in 1995 and 1996. The State is striving to maximize revenues while at the same time preventing a major disruption in the iron ore market and in the company's activities. Simultaneously, it plans to retain a golden share which would give it veto power over key decisions concerning the future of the company. The country's Government in 1996 announced that the sale of its shareholding would proceed in tranches: (i) 40-45 per cent of voting shares would be auctioned during the first quarter of 1997, (ii) 4.45 per cent would be sold to employees under favourable conditions shortly thereafter, and (iii) the balance of the state's holding (26.5-31.5 per cent of voting shares) would be dissolved after three months, with buyers being allowed to acquire not more than 2 per cent to 3 per cent of the capital. The companies acquiring the first block should form Valecom, a holding company which would control CVRD. After the announcement, political opposition to the privatization of the company rose considerably within Brazil, which may eventually delay or even prevent its accomplishment. Supposing that it nevertheless proceeds either at the set dates or later, the composition of the future controlling interests of the company will have a crucial role in determining the impact of the company's privatization on the world iron ore market, given the size and the importance of the company. The Brazilian Government

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[13] Mining industry turns its back on fund raising. *Financial Times*, March 6, 1996.

has foreseen restrictions so as to prevent major costumers (i.e., large domestic and foreign steelmakers), iron ore traders and competitors (i.e., other significant established iron ore producers) from securing a controlling stake during the first auction. If it succeeds in its intent, it is unlikely that the privatization process will have a major impact on the company's operations and future strategies. However, if companies from the iron ore industry and/or the steel industry succeed in gaining control of a significant part of the shares, this would likely have a disruptive impact on the industry. A strong steel company presence would probably weaken CVRD's position during price negotiations; an overwhelming weight of firms which already have an interest in iron ore, on the other hand, would give the acquirers a disproportionately strong position in the world market. As regards privatization revenues, estimates of the total price of the shares to be sold vary from US$ 4 billion to US$ 10 billion.

51. Iron ore companies (including State-owned ones) are themselves taking part in privatization operations in a sector which is of crucial importance to their operations and profitability, namely railway transportation. While waiting for its own privatization, CVRD continues to diversify its activities, *inter alia*, by investing in railways, a sector which is contributing a growing share of its overall revenues. The company has taken part in the privatization of one branch of Brazil's federal railway system (its central-eastern portion), through a joint-venture that also included Companhia Siderúrgica Nacional (the country's largest steel producer) and foreign investors. The southern part of the Brazilian federal railway system was auctioned in September 1996 to a consortium formed by two iron ore producers - MBR[14] and Ferteco- and Brazil's major steel companies. Another company for which control of the railway that transports its products is considered as a key component of the corporate strategy is Sweden's LKAB. Therefore, in July 1996, the railway that channels iron ore from its mines to the sea started being run by a private Swedish-Norwegian company controlled by LKAB.

52. Partly in order to raise funds to take part in the privatization of the Brazilian railway, MBR's controlling group, Caemi, has announced its intention to divest itself of its 25 per cent stake in Canada's Quebec Cartier Mining iron ore company. Another change that has been announced in the ownership structure of the North American iron ore industry regards the region's foremost producer, Eveleth Mines. Oglebay Norton Co. will sell its 18.5 per cent interest in Eveleth Mines to its other current owners, Eveleth Taconite Co. and Eveleth Expansion Co.

IV. TRADE IN IRON ORE

53. International trade in iron ore reached a new record in 1995, when almost 452 Mt were exported worldwide. This was 23 Mt more than during the previous year, thereby accumulating a 22 per cent increase in the three years that followed the slump of 1992. Over this period, international

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[14] MBR is the country's second largest producers of iron ore (after CVRD). This acquisition will allow the company to complete an integrated system of iron ore mine, railway and loading port.

trade in iron ore expanded by 82 Mt, while world production of crude steel grew by only 26 Mt. This sharp contrast results basically from two different trends: (i) steel production increased most heftily in Asia, which is highly dependent on imports of iron ore; and (ii) the plummeting of the steel output of the republics of the former USSR (even larger than the increase in Asian production), which had a strong impact on world output levels but not on iron ore trade (since they use domestic raw materials as an input).

54. The international iron ore trade was extremely active during the first half of 1995 (when expectations for an even stronger market had led consumers to raise their purchases over the level of 1994). From the July-December period onwards, however, the market softened, as the economic slowdown and/or stagnation in major developed countries (particularly in the EU) led steel industry players to adopt a more cautious attitude. Imports into the European Union declined sensibly from the last quarter of the year into 1996, under the impact of falling steel production. Japan's external purchases of iron ore, by contrast, were sustained until the end of 1995, but fell 3.3 per cent during the first half of the following year.

55. The total value of world exports of iron ore rose to US$ 8.3 billion (FOB) in 1995. Contrary to what happened to the volume of exports of iron ore, export revenues were 5 per cent lower than their record level reached in 1991. The reason for this is that the strong expansion of volume traded between 1993 and 1995 was not enough to compensate for the fall that prices accumulated over that period (see paragraphs 63-68).

Table 5
Iron ore exports by major exporting countries, 1988 - 1995
(million tons)

Country	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
1 Australia	95.0	96.2	106.6	116.5	126.2	139.0	30.8	10.2
2 Brazil	105.3	114.3	106.0	111.9	125.0	131.4	29.1	5.1
3 Former USSR	43.1	36.3	30.0	31.0	31.1	33.6	7.4	8.0
4 India	32.1	31.6	28.5	31.5	32.0	32.0	7.1	0.0
5 Canada	30.5	27.0	25.1	26.1	30.1	28.8	6.4	-4.3
6 South Africa	11.5	17.0	14.9	19.0	19.6	21.8	4.8	11.4
7 Sweden	17.5	16.4	15.5	16.4	15.4	17.1	3.8	11.0
8 Mauritania	10.0	11.4	8.1	9.7	10.3	11.5	2.5	11.3
9 Venezuela	12.3	13.6	10.2	10.5	10.7	10.6	2.3	-0.8
10 Chile	6.4	6.5	5.7	6.3	6.6	6.1	1.4	-7.9
WORLD TOTAL	**397.0**	**390.7**	**370.0**	**399.8**	**429.0**	**451.9**	**100.0**	**5.3**

Source: UNCTAD secretariat

56. On the exporting side, four fifths of the net growth in world exports were generated by the

two largest suppliers, Australia and Brazil. In 1995 each of them accounted for approximately 30 per cent of world total exports. Australia not only remained the largest exporting country, but its lead over Brazil rose to more than 7 Mt (see table 5).

57. However, it was the exports of Sweden, South Africa and Mauritania which experienced the strongest relative rise. In Sweden, exports of pellets expanded by one third, thanks to the operation of LKAB's new pellet plant, while total exports increased by a more moderate 11 per cent. South Africa's exports, on the other hand, grew thanks to the country's increased iron ore production and to the better conditions of infrastructure, while the expansion in Mauritania's exports was brought about by SNIM's operating closer to capacity and by the first full year of operation of the M'Haoudat mine.

58. On the importing side, the overall expansion in trade was brought about mainly by the growth in demand in the largest markets of Asia (basically Japan, China, Taiwan Province of China and Republic of Korea), which accounted for over half of the world total net imports growth. Surprisingly, the region that gave the second largest contribution to the expansion of world imports was Eastern Europe. It was followed by Western Europe. The growth of iron ore import demand was pushed by the expansion of steel output in these markets (with the exception of China) and by the fact that scrap price reached new highs during the year.

Table 6

Iron ore imports by major importing countries, 1988 - 1995

(million tons)

Country	1988	1990	1992	1993	1994	1995	1995 % of world	1995/1994 change (%)
1 Japan	123.4	125.3	113.7	114.5	116.1	120.4	27.2	3.7
2 Germany[a]	45.2	43.7	41.3	35.3	42.7	43.0	9.7	0.8
3 China	10.5	14.3	25.2	33.0	37.3	41.2	9.3	10.4
4 Republic of Korea	16.5	22.5	31.8	35.5	34.2	35.0	7.9	2.5
5 United Kingdom	17.9	14.7	15.8	15.9	19.5	20.8	4.7	6.9
6 France	18.7	18.8	17.2	16.5	20.1	20.2	4.6	0.6
7 Italy	16.2	17.2	15.1	16.7	16.4	18.3	4.1	11.6
8 United States	20.1	18.1	12.5	14.0	17.5	17.5	3.9	0.3
9 Belgium/Luxembourg	20.8	20.3	18.0	15.8	16.6	16.3	3.7	-2.1
10 Former Czechoslovakia	14.7	14.2	11.8	12.5	12.4	13.8	3.1	0.0
memo item: EU (15)	*139.0*	*137.5*	*130.2*	*123.6*	*139.8*	*143.8*	*32.4*	*2.9*
WORLD TOTAL	**395.3**	**399.7**	**377.3**	**391.2**	**420.3**	**443.5**	**100.0**	**5.5**

Source: UNCTAD secretariat

a - From 1991, unified territory.

59. Japan remained the largest importing country, accounting for more than one fourth of world

total imports. Its imports of iron ore grew to 120 Mt. The European Union in 1995 was once again the major importing region, absorbing 144 Mt of imported iron ore, its main market, Germany, remained world's second largest importing country. In the United States, the 8 per cent surge in domestic production of iron ore was sufficient to meet the growth in domestic consumption, so that imports remained constant at 17 Mt.

60. The importance of developing Asia as an import market for iron ore continued strengthening, which is set to proceed in the coming years. Its largest developing country importer is China, whose foreign purchases of iron ore grew by 10 per cent to 41 Mt in 1995 (even though this did not result in higher steel production). Thus, the country's imports edged closer to those of Germany, the world's second largest importer. Another Asian country, Republic of Korea, was the fourth largest iron ore importing market in 1995 (see table 6).

61. Preliminary data indicate that in 1996 China displaced Germany as the second largest importing country. Its imports continued expanding vigorously (by 11.3 per cent in the January-July period), while German ones fell sensibly. By the turn of the century, Chinese yearly imports of iron ore are expected to reach between 60 Mt and 70 Mt[15]. In order to secure its foreign supply of iron ore, China has adopted a policy which aims at having equity participation (through joint-ventures or complete ownership) in mines supplying half of its imports of iron ore. The first steps in this direction have been: (i) the country's direct investment in the Channar and Portman mines (Australia); (ii) the acquisition of the Peruvian producer Hierro Peru when it was privatized; and (iii) negotiations with iron ore producers CVRD and MBR to discuss the establishment of a mining joint-venture in Brazil.

62. In Eastern Europe, the 18 per cent rise in imports (to 34 Mt) was pushed by the further strengthening of the region's steel production and exports. The region's iron ore imports grew in 1995 for the third consecutive year, gradually recovering from the slump of the early 1990s. The level reached so far, however, was still one fifth lower than that of 1990. Eastern Europe continued sourcing its iron ore mainly from the Russian Federation and Ukraine. This greatly contributed to the 28 per cent surge of total Russian iron ore exports. However, the share of other suppliers in the region's total imports grew from 10 per cent to 23 per cent between 1994 and 1995, as Eastern Europe raised its imports from South Africa, Australia and Brazil[16].

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[15] China iron ore imports set to rise. *Mining Journal*, November 24, 1995; Liu Qi, *The Chinese iron and steel industry - Strategic research into long-term iron ore imports*, paper presented at the "Iron ore and its Markets Conference" (Perth, Australia, 26-28 May 1996).

[16] Central and Eastern European imports from non-CIS suppliers will grow substantially if Huta Katowice and CVRD's announced plans to build an iron ore terminal in Gdansk are brought into practice. It would channel seaborne iron ore imports into Poland and other Eastern European countries.

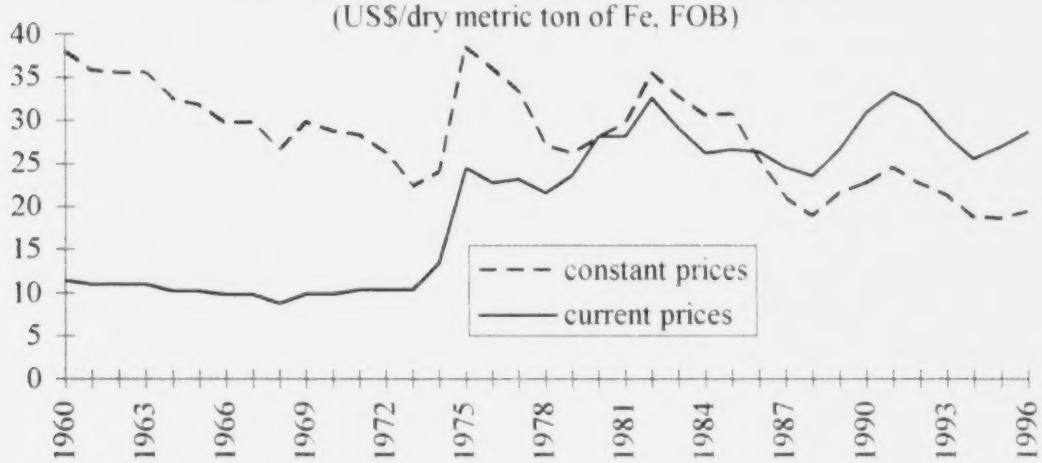
V. IRON ORE PRICES

63. In 1995 prices finally started reflecting (at least partially) the strength of the iron ore market, as the reference price for fines increased by 5.80 per cent. From 1992 to 1994, they had fallen sharply, despite the growth of the world iron ore market over that period. Fines and lumps accumulated price reductions varying from 19.8 per cent to 27 per cent, while pellet prices did not fall in 1994, so that between 1992 and 1993 the total price cut amounted to 16.3 per cent. In 1995, by contrast, producers succeeded in negotiating moderate price increases. The continuing strength of the iron ore market enhanced the position of exporters. Therefore importers (particularly the Japanese) pressed for an early settlement of price negotiations, fearing that delays would further strengthen the suppliers' stance. The benchmark settlement for fines and lumps was made by BHP Iron Ore and Japanese importers already in December 1994. On the following day, Brazil's CVRD and German buyers reached an agreement regarding prices for pellets in the European market.

Chart 4

Iron ore constant and current prices, 1960 - 1996

(US$/dry metric ton of Fe, FOB)



Source: UNCTAD secretariat

Notes: Current prices (expressed in terms of 1980 dollars) deflated by the United Nations index of unit value of manufactured goods exports. Reference price: CVRD fines (Brazil) to Europe (64.5 per cent Fe).

64. Given the tightness of the pellets market, import prices for these products had the highest relative increase in Europe: 12.60 per cent, which brought nominal prices back to the average level of 1991-1992. Thereby the premium of pellets over fines rose from 18.17 US$/DMT (dry metric ton) of Fe to a record 22.19 US$/DMT of Fe. Since in recent years the market for lumps has also been tight, their prices in the Japanese market were raised by 7.90 per cent to approximately the same level of 1993. This pushed their premium over fines from 7.72 US$/DMT of Fe to an unprecedented 8.88 US$/DMT of Fe. Finally, the smallest increase in prices was that obtained for fines: 5.80 per cent.

65. Price negotiations for 1996 took considerably longer than in the previous year, as importers delayed the final settlement in order to wait for the effects of the weakening of the world iron ore market (see paragraph 54) to be felt. This way they succeeded in resisting producers' claims to substantial price increases. The benchmark prices were settled at the end of January 1996, once again by BHP Iron Ore and Japanese steelmakers. Thus, for the second consecutive year BHP Iron Ore was the first price setter in the Japanese market, a position which since 1988 had been occupied by the other large Australian exporter, Hamersley Iron. Acknowledging this, BHP's committed tonnage to that market rose from 9.2 Mt to 14.6 Mt between FY 1994 and FY 1996, while that of Hamersley fell from 18 Mt to 16.4 Mt (the actual quantities, however, do not necessarily correspond to the committed tonnages).

66. Price rises were agreed in 1996, though they were considerably more modest and homogeneous than those of the previous year. Prices rose by between 4.99 per cent (lumps in the Japanese market) and 6.63 per cent (pellets in Europe). The price of fines rose 6 per cent and therefore the price premium of lumps rose marginally to 9.04 US$/DMT of Fe (for Australian lumps exported to Japan). Integrated steelmakers also resisted having the tightness of the pellets market totally reflected on prices, which would cause the pellet price differential on fines to widen considerably and exert further pressure on them to change their raw materials mix. Therefore, negotiations were very difficult in the European market and the first price agreement was reached only in late February 1996, between the Iron Ore Company of Canada and German importers. While in 1995 the pellet differential on fines grew by 22 per cent, in the following year it rose by 7 per cent. Despite the lower growth rate of the pellet premium over fines, it once again reached a record level, amounting to 23.83 US$/DMT of Fe (for Brazilian pellets in the European market). This was the third consecutive year in which the pellet premium widened. There was a consensus that the pellet premium had reached its limits (justifying, for instance, steelmakers' return to sintering where possible) and that it would be reduced in the price negotiations for 1997. The premium for lumps was also likely to be reduced during these negotiations.

67. Iron ore producers in 1995 benefited from the rise in iron ore prices negotiated at the end of 1994. However, in the case of the largest exporters, Australia and Brazil, the potential sales revenue increase was partially offset by the appreciation of their national currencies against the United States dollar (in which iron ore prices are set).

68. In 1996, real iron ore prices rose for the first time since 1991. However, the price increases negotiated for 1995 and 1996 have not been enough to compensate for the fall in real terms accumulated since the last cyclical peak. Consequently, real prices in 1996 were still 21 per cent below their 1991 level (see chart 4).

VI. TRANSPORTATION COSTS AND FREIGHT RATES

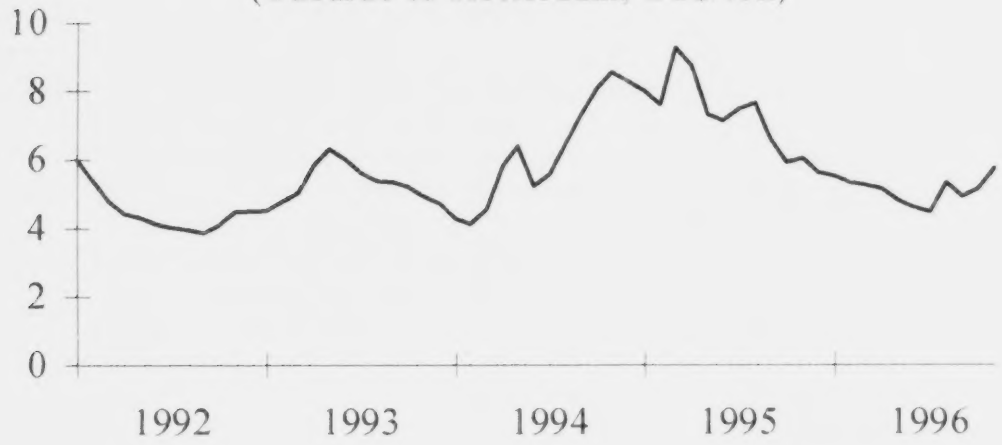
69. Driven by the unprecedented boom in the iron ore market, seaborne iron ore trade reached a new record in 1995. This was due to the fact that most of the expansion of exports was generated

by Brazil and Australia, all of whose exports of iron ore are seaborne. Estimates of total volume traded by sea during that year vary from 400 Mt[17] to 412 Mt[18], which means that this mode of transportation accounts for the bulk of international trade in iron ore: between 89 per cent and 91 per cent of total world exports. Iron ore accounted for more than one quarter of international seaborne bulk trade[19]. Over the last three years, the volume of seaborne iron trade is estimated to have grown by the significant amount of 70 Mt[20]. In 1995 iron ore remained the internationally most traded non energy commodity in terms of volume and value.

Chart 5

Iron ore freight rates, 1992 - 1996

(Tubarão to Rotterdam, US$/ton)



Source: SSY

70. Freight rates followed an uneven path along the year. The record tonnages reached by the iron ore and coal transportation, as well as the strength of other bulk trades, pushed dry bulk freight rates to a record level in May. Thereafter, however, freight rates dropped sharply (see chart 5). Though the softening of the iron ore market during the last quarter (particularly due to falling Western

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17 SSY estimate (*Annual Shipping Review 1995*), which coincides with that of Ocean Shipping Consultants (Steel raw material shipping forecast to 2010. *The Tex Report*, April 30, 1996) and of Fernleys (Seaborne iron ore trade transition for the past 17 years. *The Tex Report*, January 26, 1996).

18 Seaborne iron ore tonnage records another new peak. *International Bulk Journal*, May 1996.

19 Ocean Shipping Consultants estimate as quoted in: Ocean shipping compiled by new studied data and forecast. *The Tex Report*, March 22, 1996.

20 SSY, *Annual Review 1995*.

European imports) contributed to that, the main reason for the steep fall in freight rates was the sudden increase in seaborne transportation capacity. The record levels reached by freight rates had led the shipping industry to raise substantially the number of new ships entering the market. Still, for the year of 1995 as a whole, freight rates applied to iron ore trade were on average one fifth higher than during the previous year. This put iron ore exporters located far away from their consuming markets at a disadvantage relatively to those exporters who have to cover shorter distances to reach their consuming markets.

71. The declining trend of freight rates continued during the first half of 1996, so that by June the rates on the capesize market had fallen to their lowest level since early 1994. Then they began the upward phase of the price cycle that came to an end two and a half years later. However, it is foreseen that over the medium term freight rates will recover together with the reduction of overcapacity through the scrapping of older and larger ships and the expected growth of the seaborne iron ore market[21]. Already from August 1996 onwards, the falling trend of freight rates was reversed, under the impact of strengthening activity in the dry bulk shipping market (see chart 5).

VII. ENVIRONMENTAL AND TECHNOLOGICAL ISSUES

72. Environmental legislation has had an indirect impact on recent developments of the iron ore market. The urge to curb emissions from sintering plants has led several steelmakers to close their sintering operations in favour of using higher-grade ores (like lumps and pellets) and environment-friendlier metallics such as DRI. However, the continuation of these processes might lead to conflict between profitability of steelmaking operations and the drive towards "cleaner" production processes and methods. If producers are successful in maintaining the premium of higher-grade ores (or at least not reducing it substantially) in future price negotiations, integrated steelmakers would consider the alternative of reverting more strongly to sinter as an input. This could be achieved by reopening some of their previously closed down sintering plants, which use lower-priced fines and concentrates as an input[22]. Naturally, the limit to the extent to which this alternative may be used is environmental legislation.

73. Underpinned by the continuous growth of EAF production, the tightness in the scrap market is expected to continue in the coming years. This, in turn, has led to stronger research and development of new technologies to produce iron on the basis of scrap substitutes. So far, the development to the commercial stage has been more successful in the field of direct reduction. The research in this field aims at reducing production costs, optimizing the use of alternative raw material

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[21] Freight rates forecast to show an increase. *Metal Bulletin*, 29 April 1996.

[22] Thyssen Stahl (Germany), for instance, in 1995 restarted the smallest of its sinter plants after they had been idled for two years, because of the price premium of lumps and pellets over fines and concentrates (Sintering under pressure? *Metal Bulletin Monthly*, February 1996).

inputs (e.g., by using fines or pellet feed instead of pellets or coal instead of gas as a source of energy), speeding up the production process, obtaining higher quality output and achieving a better environmental performance.

74. Nucor continued the fine tuning of its iron carbide operation in Trinidad and Tobago in order to overcome the technical problems encountered so far. The adoption of this technology in other plants in being considered. The construction of several direct reduction operations using new technologies for the first time on a commercial scale has been announced: BHP's Port Headland (Australia) plant will use the Finmet technology; Cliffs and Associates' facility in Trinidad and Tobago will be the first commercial application of the Circored-Lurgi technology; KM Iron LLC will adopt the Fastmet process in its New Orleans plant (United States); the Inmetco technology will be applied at Nakorn Thai Steel's plant in Chonburi (Thailand); Nisco brought its nationally developed Ghaem DR technology to commercial scale as it commissioned its new DR plant in Isfahan (Iran) in September 1996.

75. In what regards hot metal/pig iron production technology, the South Australian Steel and Energy group has announced that it is going to adopt the Ausmelt technology in a demonstration plant in 1996, which will be developed into a commercial scale plant in 1997. Thereafter, the process would be ready to be commercialized. The company claims that this technology would allow the plant to have one of the world's lowest production costs[23]. The Brazilian iron ore producer MBR has announced the construction in the United States of the first industrial-scale iron smelting plant using the Tecnored process. It has been developed by MBR and started being commercialized in 1996. At the same time, a number of new smelters are being designed to produce iron using fines but not coke, which could eventually supply basic-oxygen furnaces: CCF, Finex, DFIOS, HIsmelt and Romelt.

76. In the upstream activity of iron ore mining, technological change is being induced, among other factors, by the ever stricter quality standards that steelmakers and DRI producers are increasingly demanding from the iron ore industry. For both environmental, technological and commercial reasons, iron ore consumers over the last decade have been increasing their requirements for higher-grade iron ore with lower impurities content and a far stronger homogeneity in the flow of iron ore deliveries (in terms of Fe content, trace elements, humidity, etc.). In order to meet these new specifications, the iron ore industry has embarked on a quality drive. More than 70 per cent of worldwide iron ore trade has already achieved ISO 9000 certification or is working towards it. However, this is only the starting point. The complete process of quality management and assurance involves much deeper change in terms of production process, management and quality control, e.g., the larger use of beneficiation and sorting of ores and the adoption of on-line analysis of the output flow[24].

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[23] Australian group plans new iron plant. *Metal Bulletin*, 27 June 1996.

[24] J. Rogers, *Quality considerations in the production and trade of iron ore*, paper presented to the fourth session of the Intergovernmental Group of Experts on Iron Ore (Geneva, 23-25 October 1995).

VIII. THE MARKET IN 1996

77. The major industrialized economies in 1996 took longer than initially expected to recover from the slowdown which they had experienced since the end of the previous year. This was particularly the case of Japan and Western Europe, whose economies experienced a mild recovery only during the second half of 1996. The United States, on the other hand, had steady economic growth along the year. Preliminary data show that in 1996 developed countries had approximately the same growth rates as during the previous year. However, the sectoral composition was probably different, with a generally lower contribution of steel-intensive sectors like manufacturing investment and construction. The Asian developing countries continued experiencing a strong economic expansion, even though at a slower pace than in 1995.

78. Preliminary figures indicate that world crude steel production experienced a slight contraction in 1996 (less 1.2 per cent during the first ten months). Output was cut back in industrialized countries as producers and consumers strove to reduce their high stocks, which had accumulated during the second half of 1995. This was especially the case of Western Europe and Japan, whose steel production between January and October fell by 6.4 per cent and 4.1 per cent, respectively, as compared to the corresponding period of 1995. European and Japanese producers were affected by slowing demand both at home and abroad. The sluggishness of demand in West Europe and in other export markets affected negatively the Eastern European steel industry, whose crude steel output fell by 11.7 per cent over the same period. In the Russian Federation it declined at a more moderate pace (3.4 per cent), as its steelmarkers continued being successful in exporting part of their production in all major steel importing markets. By contrast, the situation was brighter in North America. The continuing expansion of the United States economy sustained steel demand, so that domestic output grew moderately (with a 1.1 per cent year-on- year growth during the first ten moths of 1996) and the country's imports prodded Mexican output to expand by 10.8 per cent.

79. The bleak picture of the steel market and production in Europe and Japan and the moderate expansion of North American output contrasted with the situation of developing Asia. Despite the region's projected lower economic growth (as compared to that of 1995), its dynamism still provided a strong stimulus for steel production, particularly in China, Republic of Korea, India and Taiwan Province of China. These producers' combined crude steel output experienced by far the quickest expansion in 1996: it grew by 5.5 per cent between January and October over the corresponding period of the previous year. At the same time, steel production in South America had a quite moderate growth: 1.5 per cent.

80. The iron ore market was hit by the poor performance of the steel industry in the main importing markets, Western Europe and Japan, which was only partly compensated by the strong growth rate of the steel industry of some Asian developing countries. The main iron ore producers, Brazil and Australia, had their exports reduced year-on-year in 1996 by 3.5 per cent (from January to October) and 5.9 per cent (during the first six months), respectively. On the importing side, the trading picture resembles that of steel production. While German imports experienced a significant decline (being 6.7 per cent lower between January and April than in the corresponding period of

1995), those of Japan fell moderately by 0.9 per cent during the first ten months of 1996. By contrast, import demand was considerably stronger in developing Asia. Imports into China grew by 11.3 per cent during the first nine months of the year, while those of Taiwan Province of China expanded by 17.3 per cent between January and August[25]. Activities in the world iron ore market accelerated slightly towards the end of the year. Overall, however, it is projected that international trade experienced a contraction of between 2 per cent and 5 per cent during 1996. In the latter case, the level of exports and imports would be approximately the same as that of 1994. A moderate contraction in 1996 would still mean that trade volume was high, given that the basis for comparison (1995) was a peak year. As regards iron ore production, it probably fell slightly in 1995, as most producers adjusted their output to the fall in demand.

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[25] The Republic of Korea presented a mixed picture: its pig iron production grew by 3.4 per cent in the year up to September, but its imports of iron ore declined by 2.9 per cent, which may possibly be explained by destocking.

Annex I

Planned changes to the capacity of iron ore mines, 1996 onwards

Country Mine/orebody	Company	Capacity change (Mtpy)	Effective date	Investment (US$ million)	Notes
Australia					
Yarrie 10	Mt. Goldsworthy (BHP)	+ 2	2000		New deposit to extend life of Yarrie for 5 years
Jimblebar	BHP	+ 5			Capacity expansion from 3 Mtpy. Work started late 1995
Orebody 18	BHP	+ 10	1998		New orebody in Mt. Newman lease. Work started in mid-1996
Yandi 2	BHP	+ 10	1996	38	New orebody to expand Yandi capacity from 15 Mtpy
Robe River	Robe River	+ 2	1996		Upgrading operation to produce lump ore, additionally to 27 Mtpy of sinter feed
West Angelas	Robe River	+ 25	2000	346	New mine. Detailed feasibility study underway
Channar	Hamersley/CNIEC	+ 4	1998		Capity expansion from 6 Mtpy
Yandicoogina	Hamersley Iron	+ 10	1998	300	New mine. Later expansion to 15 Mtpy foreseen
Tallering Peak	Midwest Iron & Steel	+ 1.4	1999	1800 (total)	Part of mine/pelletizing/DRI/steelmaking complex. Construction to start in late 1996
Savage River	Savage River Mines	- 1.6	1997		Closure due to reserve depletion
Fortescue	Mineralogy Pty	+ 5	?	1275 (total)	Part of mine/HBI/steel complex, at planning stage
Mt. Gibson	Asia Iron	+ 4	?	600 (total)	Part of mine/pelletiser/DRI/HBI complex, at planning stage
Austria					
Erzberg	Voest-Alpine Erzberg	- 1.3	2003		Mine closure due to reserve depletion
Brazil					
Capanema	CVRD/Kawasaki/others	- 6	2003		Closure due to reserve depletion
Conceição	CVRD	+ 6	1996	17	Capacity expansion from 14 Mtpy, partly replacement of purchased ore and of falling output at Cauê mine
Timbopeba	CVRD	+ 3	1999		Expansion from 7 Mtpy to produce pellet feed
Brucutu	CVRD	+ 5	1998		Expansion from 2 Mtpy to produce pellet feed
Fazendão	CVRD	+ 3.9	1998		Orebody to be restarted
Carajás	CVRD	+ 6	late 1990s		Capacity expansion from 44 Mtpy to replace output from Southern system mines
Corumbá	MCR	+ 3.2	1998		Expansion from 0.8 being considered
Alegria	Samarco	+ 3	1997	250 (total)	Capacity expansion from 9.5 Mtpy to feed new pellet plant
Aguas Claras	MBR	- 8	2003		Closure due to reserve depletion
Tamanduá/Capitão do Mato	MBR	+ 3. 5	2002		Complex to replace Águas Claras
Mutuca	MBR	- 5	2003		Closure due to reserve depletion
Capão Xavier	MBR	+ 6.5	2010		New mine to replace Mutuca

Annex I

Planned changes to the capacity of iron ore mines, 1996 onwards

Country Mine/orebody	Company	Capacity change (Mtpy)	Effective date	Investment (US$ million)	Notes
Chile					
Los Colorados	Cía Minera Huasco	+ 3.8	1998	107	Capacity expansion from 1.2 Mtpy to replace Algarrobo output
Algarrobo	CMP	-3.8	1998		Closure due to mine depletion
France					
Mont Rouge	ARBED	-1.8	1997		Closure due to Arbed's switch to EAF in all of its steelworks
India					
Bailadila deposits no. 10, 11-A, 11-B	National Mineral Devt Corp	+ 9	1997		Work in progress on capacity expansion from 13 Mtpy
Iran					
Chador Malu	Nisco	+ 5	1996	600	New mine
Republic of Korea					
Yeon Pyeong	Dong Won Mining	- 0.4	1999		Closure due to reserves depletion
Mexico					
Cerro Nahuatl	Hyslamex	+ 1	2000	35 (total)	Reactivation and upgrading of previously closed mine to produce pellets for DRI plant
Colima	Hyslamex	?	1997	10	New mine
Norway					
Sydvaranger	Sydvaranger	- 1.5	1997		Mine/pellet plant closure due to unprofitable operations
Russian Federation					
Yakovlevsky	Federal Property Fund	+ 4.5	1999	65	New mine
Soilenky	Federal Property Fund	+ 1.7	1997		Capacity expansion
Saudi Arabia					
Wadi Sawawin	Saudi Arabian Minerals	+ 4.5	late 1990s		Part of new mining/pelletizing complex
Slovakia					
Nižná Slaná	Železba Siderit	+ 0.05	late 1990s		
South Africa					
Sishen	ISCOR	+ 3	1999		Capacity expansion from 24 Mtpy to raise exports and provide raw material for Saldanha Steel. Later expansion to 32 Mtpy foreseen
Sweden					
Kiruna	LKAB	+ 2	1996	315	Capacity expansion
Venezuela					
San Isidro	FMO	+ 4	1996	182	Upgrading of existing operations through new concentration plant
San Isidro	FMO	+ 4	2001	132	Upgrading of existing operations through new concentration plant
El Pao	FMO	- 2.4	1997		Mine closure

Annex I

Planned changes to the capacity of iron ore mines, 1996 onwards

Country Mine/orebody	Company	Capacity change (Mtpy)	Effective date	Investment (US$ million)	Notes
Zimbabwe					
Redcliff	Buchwa Iron Mining Co	+ 2	1997		Expansion of existing capacity
Vishavane	Buchwa Iron Mining Co	- 0.03	1997		Closure due to reserve depletion

Source: UNCTAD secretariat, based on commercial journals and company and official information.

Annex II
Planned changes to the capacity of pellet plants, 1996 onwards

Country Plant	Company	Capacity change (Mtpy)	Effective date	Investment (US$ million)	Notes
Australia					
Cape Lambert	Robe River	+ 5.2	?	195-234	Recommissioning of closed down plant in feasibility and marketing study phase
Narngulu	Midwest Iron & Steel	+ 1.4	1999	1800 (total)	Part of mine/pelletizing/DRI/steelmaking complex. Construction to start in late 1996
Cape Lambert	Australian United Steel Industry	+ 3.6	?	550	Part of pelletizing/DRI complex, at planning tsage
Geraldton	Asia Iron	+ 2	?	600 (total)	Part of mine/pelletizing/HBI complex, at planning stage
Savage River	Savage River (Cleveland Cliffs)	- 1.25	1997		Mine/pellet plant closure due to reseve depletion
Bahrain					
GIIC	GIIC	+ 1.7	1997		Capacity expansion from 3.3 Mtpy
Brazil					
Ponta Ubu	Samarco	+ 6	1997	250 (total)	Second plant of Samarco; project includes mine expansion. Half of output will be DR pellets, other half BF pellets
CVRD 1	CVRD	+ 1	late 1990s		Capacity expansion from 2 Mtpy
CVRD 2	CVRD	+ 1.1	late 1990s		Capacity expansion from 3 Mtpy
Itabrasco	CVRD/Ilva	+ 2	late 1990s		Capacity expansion from 3 Mtpy
Hispanobrás	CVRD/Ensidesa	+ 2	late 1990s		Capacity expansion from 3 Mtpy
Nibrasco 5	CVRD/Japanese mills	+ 0.8	late 1990s		Capacity expansion from 3.5 Mtpy
Nibrasco 6	CVRD/Japanese mills	+ 0.8	late 1990s		Capacity expansion from 3.5 Mtpy
Kobrasco	CVRD/Posco	+ 4.5	1998	220	New plant
Chile					
Los Colorados	Cia Minera Huasco	+ 3.8	1998	107	Expansion from 1.2 Mtpy to replace Algarrobo output
India					
	Kudremukh Iron Ore	+ 0.5	1998		Expansion fom 3 Mtpy
Visakhapatnam	Essar Gujarat	+ 3	1996		During initial two years, pellets for BF use, later for DRI use
Mexico					
Lázaro Cárdenas	Imexsa (Ispat)	+ 3.5	1997		Part of pelletizer/DRI complex
Cerro Nahuatl	Hyslamex	+ 1	2000	35 (total)	Part of pelletizer/DRI complex

Annex II
Planned changes to the capacity of pellet plants, 1996 onwards

Country Plant	Company	Capacity change (Mtpy)	Effective date	Investment (US$ million)	Notes
Norway					
Sydvaranger	A/S Sydvaranger	- 1.5	1997		Mine/pellet plant closure due to unprofitable operations
Peru					
Marcona no. 3	Shuogang Hierro Perú	+ 3	1998	100	Company's third plant
Marcona no. 4	Shuogang Hierro Perú	+ 3.3	2005	100	Decision to build depends on outcome of third plant
Saudi Arabia					
Wadi Sawawin	Saudi Arabian Minerals	+ 4.5	late 1990s		Part of new mining/pelletizing complex
Turkey					
Divos	Turkish Iron & Steel	+ 0.4	1996	3	Capacity expansion
United States					
Keewatin	National Steel Corp	+ 1	?		Company considering expanding plant from 5.3 Mtpy
Venezuela					
Sidor	FMO	+ 4	1997		Capacity expansion from 4 Mtpy
Puerto Ordaz	Hanbo Energy/FMO	+ 4	1998	260	Feasibility study completed, awaiting final decision

Source: UNCTAD secretariat, based on commercial journals and company and official information.

Annex III
Planned capacity changes of DRI plants, 1996 onwards

Country Plant	Company	Capacity increase (Mtpy)	Effective date	Investment (US$ million)	Notes
Australia					
Port Hedland	BHP Steel	2.5	1997	1125	First commercial operation of Finmet process. HBI output
Port Hedland	BHP Steel	2.5	?		Second phase at planning stage
Cape Lambert	AUSI (Australian United Steel Industry)	3.6	late 1990s	1050	HYL III technology in 3 modules. Construction to start in late 1996
Rockingham	Compact Steel	1.3 - 1.7	?		Part of Corex/DRI/steel complex, pending environmental approval
Dampier	Mineralogy Pty	4	?	1275 (total)	Part of mine/HBI/steel complex, at planning stage
Geraldton	Asia Iron	1.4	?	600 (total)	Part of mine/pelletizing/HBI complex, at planning stage
Narngulu	Midwest Iron & Steel	1.4	1999	1800 (total)	Part of mine/pelletizing/DRI/steelmaking complex. Construction to start in late 1996
Pilbara	Mitsubishi	0.4	?	60	Iron carbide plant. Decision depending on outcome of Nucor's Trinidad plant
Kwinana	Compact Steel/VAI/Clough Engineering			1000 (total)	Part of Corex/DRI/steel complex, in feasibility study phase
Bahrain					
Bahrain	Nippon Denro Ispat	1.2	1998	280	Midrex megamodule
Brazil					
Corumbá	MCR	1	1998		In feasibility study phase
China					
Tianjin	Tianjin Iron & Steel	0.3	1999		DRC process
Egypt					
ANSDK II	Alexandria National Iron and Steel Company	0.8	1998		Midrex technology
India					
Chandil	BSIL	0.15	1998		SL/RN technology
Chanpa	Prakesh Industries	0.15	1997		SL/RN technology
Raigarh	Jindal Strips	0.25	1997		Jindal process
Raipur	Monnet Ispat	0.1	1997		Jindal process
Gugus	Lloyd's Steel	0.3	1997		Osil process
Joda	Ipitata	0.12	1998		Sil process

Annex III
Planned capacity changes of DRI plants, 1996 onwards

Country Plant	Company	Capacity increase (Mtpy)	Effective date	Investment (US$ million)	Notes
Iran, Islamic Rep.					
Ahwaz	Asco (Ahwaz Steel Co.)	0.33	1997		HYL III technology to replace fixed-bed HYL I plant (upgrading)
Ahwaz	Asco (Ahwaz Steel Co.)	0.7	1998		New plant under study
Isfahan	Nisco	0.6	1996	66	Uses nationally-developed Ghaem DR technology
Republic of Korea					
Dangjin	Hanbo Steel	0.8	1997		Part of Corex/Midrex complex
Lybian Arab Jam.					
Misurata	Libyan Iron & Steel Co.	0.65	1998		Midrex technology
Mexico					
Monterrey	Hyslamex	0.7	1997	60	HYL III module, additional to existing 1 Mtpy plant, integrated to steel mill
Monterrey	Hyslamex	0.7	late 1990s	60	HYL III module, second phase of capacity expansion close to existing DRI plant, integrated to steel mill
Lázaro Cárdenas Steelworks	Imexsa (Ispat Mexicana)	1.2	1998		Midrex megamodule
Oman					
Muscat	Halla Group/Bahwan group	2	2001		Fesibility study being undertaken
Peru					
Marcona	Shougang Hierro Peru	0.8	?		Decision depends on confirmation of additional reserves at Marcona mining district
Arequipa	Aceros Arequipa	0.3	1997		SL/RN technology
Russian Federation					
Lebedinski	Lebedinski GOK	1	late 1990s	200	Under construction. HYL technology
Saudi Arabia					
Al Jubail	Saudi Iron and Steel (Hadeed)	1.1	1998	160	Fourth DRI module. HYL technology. Integrated to expanded Hadeed steel mill

Annex III
Planned capacity changes of DRI plants, 1996 onwards

Country Plant	Company	Capacity increase (Mtpy)	Effective date	Investment (US$ million)	Notes
South Africa					
Saldanha Bay	Saldanha Steel (Iscor/Industrial Development Corp.)	0.8	1998	1760 (total)	Part of Corex/Midrex complex, integrated to Saldanha Steel mill. Under construction
Saldanha Bay	Saldanha Steel (Iscor/Industrial Development Corp.)	0.8	1999	1760 (total)	Part of Corex/Midrex complex, integrated to Saldanha Steel mill. Planned
Germiston	Scaw Metals	0.2	1996	44	Davy technology (DRC process) plant to replace scrap feed to steel mill
Taiwan Province of China					
	Kuei Yu Group/CSC	3	after 2000		Part of Corex/DRI/steel complex, at planning stage
Thailand					
	Nippon Denro Ispat/Thai Union Steel Co.	1.2	?	$ 300m	
Chonburi	Nakorn Thai Steel	0.5	1997		First commercial application of Inmetco DRI technology, part of DRI/steel complex
Bang Saphan	Sahaviriya Steel Industry	1.8	1998		Part of DRI/steel complex
Trinidad and Tobago					
Point Lisas	Cliff & Associates (Cleveland Cliffs/LTV/Lurgi)	0.5	1998	250	First commercial application of Lurgi Circored technology; possible expansion to 1.5 Mtpy by 1999
Point Lisas	Nucor	0.9	1998		Second plant using iron carbide technology
United States					
Mobile, AL	Tuscaloosa Steeel Corp (BS)	1	1997	148	Twin-module Midrex plant being transferred from Scotland
New Orleans, LA	KM Iron LLC (Kobe Steel/Mitsui & Co.)	0.9	1998	200	First commercial application of Fastmet technology
Convent, LA	Birmingham Steel/GS Industries	1.2	1997	350	First of two Midrex modules
Convent, LA	Birmingham Steel/GS Industries	1.2	1988	350	Second of two Midrex modules
Burnside, LA	Tondu Corp.	1.5	1998	200	HYL or Midrex technology being considered
Corpus Christi, TX	Qualitech Steel/Mitsubishi	0.72	1998	80	Iron carbide plant

Annex III
Planned capacity changes of DRI plants, 1996 onwards

Country Plant	Company	Capacity increase (Mtpy)	Effective date	Investment (US$ million)	Notes
Venezuela					
Ferroven	Posco/FMO/Hyundai/Dongbu Steel/Raytheon/Hysla	1.5	1999	318	HYL III megamodule
Puerto Ordaz	Ispat/FMO	1.2	1999	236	Midrex HBI super-megamodule
Puerto Ordaz	Orinoco Iron (BHP/Sivensa)	2.2	1999	700	Finmet technology plant to produce marketable HBI
Comsigua I	Kobe Steel/FMO/Hanbo/IFC...	1.2	1999	271	Midrex Megamodule and HBI. Output destined to partners (2/3) and tradable (1/3)
Comsigua II	Kobe Steel/FMO/Hanbo/IFC...	1 - 1.2	2001		To be built after completion of Comsigua I. Also to use Miderx technology
Puerto Ordaz	Posco/FMO	1.5 - 2	2000		DRI/HBI plant at planning stage
Puerto Ordaz	Dongkuk/Kobe Steel/CVG	1.2	2000	680	Midrex plant, part of HBI/steel complex
Minorca	OPCO	0.8	1997		Expansion of existing Midrex/HBI plant

Source: UNCTAD secretariat, based on commercial journals and company and official information.